

ozone transferring function when the fruit, &c., containing it is cooked. It is not chlorophyll, as is shown by its situation, and it seems to be intimately associated with the vascular tissue. From analogy with the animal substances hæmoglobin, fibrin, myosin, &c., which have a similar action, it may be presumed to be proteinaceous, though I am unable to indicate its chemical and other characters more exactly. The interesting analogy between the respiratory functions of animals and plants indicated by these observations will, I hope, be considered a sufficient excuse if I ask you to insert this short summary of my paper which you will receive at the same time. JAMES JAMIESON

Melbourne, July 6

### The Electro-Magnet a Receiving Telephone

THE experiment of Mr. F. G. Lloyd, described in NATURE, vol. xviii. p. 488, is simply a repetition of Page's original experiment, the basis of all telephony. The electro-magnets of ordinary relays and Morse apparatus make capital telephone receivers when their armatures are screwed up, and it is a common thing for operators at intermediate stations in America to enjoy the music that is being transmitted between the terminal stations during some telephonic display. I remember the station-master at Menlo Park telling me that the music sent from New York and received at Philadelphia was heard, much to his surprise and delight, all over his little wayside station. The effect is dependent upon the strength of the currents flowing. With a Riess' transmitter sending musical notes and voltaic currents it can be made very loud. With an Edison or a Hughes transmitter the effect is much less, and with a Bell transmitter it is almost, if not quite, inaudible.

Electro-magnets also can be used as transmitters, because their iron cores invariably contain some residual magnetism.

September 16

W. H. PREECE

### Rayons de Crépuscule

IN your issue of July 25, Mr. Abbay, in writing of Ceylon, says that, as far as he is aware, the *rayons de crépuscule* are never seen in the low country.

Allow me to add the weight of my testimony to that of Mr. Pringle, given in NATURE of August 1.

During a residence of about five weeks here, the rays have been noticed from twelve to fifteen times, and I have been told by an old resident that their appearance is very common.

This country is the perfectly flat alluvial land and marsh bordering the Gulf of Mexico, whose shores are distant about eight miles from our camp.

On fully half of the occasions have the bands been traced from the sun, without break, to the point in the east,  $180^\circ$  from it. The rays are seen best when the sun is very near or below the horizon. On the evening of August 16, the display was exceptionally beautiful. The sun had set behind a bank of dense cumulus clouds, while the remainder of the heavens was covered with very faint cirro-cumulus clouds. A band of dark blue spread from the sun, and after widening to about  $85^\circ$  near the zenith, converged to a point either in, or slightly below the horizon. This was the cloud's shadow. In the south a line about  $15^\circ$  wide, and in the north, one about  $80^\circ$  wide, were lighted up, and shone with brilliant tints, varying from rose to orange. The lines between the deep blue of the shadow, and the lighter blue, mottled with the shining, closely packed cloud flecks, were sharply marked, as sharply, indeed, as the arch in the Aurora, which it called to mind. I have noticed the phenomenon several times in Maryland, in a gently rolling country, but nowhere have I seen it as often and as distinctly as here.

JULIUS KRUTTSCHNITT

Morgan's La. and Texas R. R. Camp, St. Mary Parish,  
Louisiana, August 24

"LES rayons de crépuscule" seem not to be of uncommon occurrence. They presented a most superb spectacle at this place last Sunday evening. The weather had been extremely warm all day and the mountains were seen through a thick haze. At sunset masses of dark clouds, fringed with gold, lay along the horizon to the west, while beyond them the sky was of a beautiful pink. As the sun sank lower many bands of pink appeared, stretching from the west entirely across to the east, appearing broader and paler, of course, near the zenith.

They changed gradually in width, position, and number for perhaps half-an-hour, and then disappeared. Their changeableness indicated that they were due to clouds near the horizon.

Sing Sing-on-the-Hudson, September 3 H. S. CARHART

### The Microphone

THE form of microphone described by Mr. Gerald B. Francis (NATURE, vol. xviii. p. 383) is easily made and very efficient. It not only did for me all its inventor promised, but with a common tumbler inverted over it upon the sounding-board so as to prevent direct impact of sound waves upon the ball, it became a powerful transmitter of the human voice. I conversed easily and satisfactorily with a friend a half-mile from my end of the wire. The exact contact of the lower wire with the ball was effected by a screw with a very fine thread passing through without touching the lower block or cup. The voice must be kept low to prevent bounding of the ball so as to break contact. Bell telephones were used as receiving instruments, the batteries being Hill and Calland gravity batteries used extensively in this country upon telegraph lines. These batteries agree exactly in every respect with the one used by Prof. Hughes in his interesting experiments excepting the clay, which is not necessary, and must be a great inconvenience in a permanent arrangement.

S. T. BARRETT

Port Jervis, New York, August 30

### A White Swallow.—Albinism in Birds

BY the side of a steep sand-cliff overhanging a stream—the Cambeck, in Cumberland—I lately saw, on a glorious summer afternoon, a white swallow flying about with many other birds of the same species. A most beautiful bird it was; perfectly snow white, with perhaps a slight tinge of blueish grey near the roots of the tail-feathers. In size it seemed to be rather smaller than the swallows around it; but in its flight and pursuit of insects there was no noticeable difference. From my position at the top of the cliff I could often see the bird within a few few yards of me.

Like the grouse of which Sir Joseph Fayrer writes in NATURE (vol. xviii. p. 518), this white swallow is, I believe, of considerable rarity. I have been able to hear of only one, seen many years ago near Repton, in Derbyshire; and in numerous works on British and other birds which I have consulted, I cannot find any very precise mention of a white variety. Magillivray remarks of the *Hirundo riparia*, the species to which the bird I saw belonged, that "individuals of a whitish colour are said to occur, but I have never met with any remarkable deviations from the ordinary appearance." Yarrel speaks of a white variety of the common swallow as not uncommon; while of the same swallow, or *Hirundo domestica*, several varieties are recorded by Buffon, and among them the white, there being "no country in Europe where these have not been seen, from the Archipelago to Prussia."

Able to catch flies on a cloudless summer day, this white swallow can, I hardly think, have been an albino, although I had no opportunity of such close inspection as Sir Joseph Fayrer had of the grouse he shot near Dunrobin. Albinism in birds must, I should imagine, be altogether unknown or unobserved, for I can nowhere meet with any account of it. Undoubted albinos are sometimes spoken of as "white varieties"—an albino monkey is, or lately was, so labelled at the Zoological Gardens; and it is possible that this very general term may include some cases of albinism, even among birds.

HERBERT W. PAGE

New Cavendish Street, W., September 16

### The Hearing of Insects

I AM not aware if it is generally known that there is a wasp in South America which seems to present undoubted evidence of a faculty to hear, or it may be to feel, and distinguish certain vibrations of sound.

The wasp is a common one on the Guayaquil River; a large slender black species, much feared on account of the virulence of its sting, which not unfrequently produces fever. I, myself, though little susceptible to the bites of mosquitoes or flies, and the stings of scorpions, &c., when once stung on the finger by

a "cubo," as this wasp is called in Ecuador, had my whole hand and forearm considerably swollen for a couple of days.

A common spot chosen by the cubo for his nest is high up on a palm stem at the river-side, and natives are well aware of the danger of uttering any loud cry when in its proximity. I have frequently experimented by giving a shrill whistle—his particular abhorrence—from a safe distance, with the invariable result of all the wasps flying in confusion from the nest in manifest anger.

It is said that there is a wasp in New Granada in whose proximity one dare not speak, but for this I cannot vouch, and very possibly this may be an exaggerated account of the cubo. It would certainly be a dangerous experiment to speak loud when very close to a cubo's nest, even on the Guayas, and a shrill voice would be sure to irritate the wasp.

ALFRED SIMSON

4, Fairlie Place, Calcutta, August 20

### Circulating Decimals

IN NATURE, vol. xviii. p. 291, is an extract from a letter by Mr. R. Chartres, in which is given a remarkable property of certain circulating decimals. Mr. Chartres only refers to fractions of the form  $\frac{1}{nr-1}$  (where  $r=10$ ); but I have since found that a somewhat similar property belongs to other fractions when expressed as circulating decimals.

For instance,  $\frac{1}{7} = .142857$ ; here we observe that the last figure of the circulator is the same as the denominator of the vulgar fraction; moreover, by multiplying the 7 by 5, we get the next figure, and this by 5, taking in the remainder, gives the third from the end, and so on till we get the whole recurring decimal.

So far this is somewhat similar to Mr. Chartres' discovery, but now observe the curious property in the following fractions:—

$$\begin{aligned}\frac{1}{7} &= .142857 \\ \frac{1}{17} &= .0588235294117647 \\ \frac{1}{27} &= .037 \\ \frac{1}{47} &= .021\end{aligned}$$

In each case the last figure of the circulator is the same as the unit figure of the denominator of the vulgar fraction. Now the multipliers which give the remaining figures are, for the first fraction, 5; for the second,  $(5+7)$ ; for the third,  $(5+14)$ ; for the fourth,  $(5+21)$ ; and generally to convert a vulgar fraction of the form  $\frac{1}{nr+7}$  ( $r=10$ ) to a circulator, we put down the last figure 7 and multiply successively by  $7n+5$ .

For fractions of the form  $\frac{1}{nr+3}$  the multiplier is  $3n+1$ , and the last figure 3.

For fractions of the form  $\frac{1}{nr+1}$  the last figure in the circulator is 9, and the multiplier is  $9n+1$ .

Of course the last figure must be that one which, multiplied into the unit of the denominator, and the unit of the result being subtracted from 10, leaves a remainder of 1.

These rules added to that of Mr. Chartres include every case of fractions which, when reduced to decimals, circulate.

Littlehampton, Sussex

EDMUND P. TOY

### Autophyllogeny

WITH reference to the note in NATURE on autophyllogeny in a leaf of *Papaya vulgaris*, I wish to place on record another freak which I have more than once noticed in the Papea or Papeeta, as we call *Carica papaya* out here. The plant is dioecious, the female being stumpy and her flowers and fruit sessile; the male plant, on the other hand, is tall and graceful, and the flowers depend from long stalks. The freak I have above alluded to consists in the presence of distinct and well-formed fruit on the male plant, and I regret I was unable, on both occasions, to secure the anomalous production for examination.

R. F. HUTCHINSON, M.D.,

Mussooree, August 19

Surgeon-Major, Bengal Army

### The Sea-Serpent Explained

THE letters of Dr. Drew and others remind me of what I witnessed at Sandgate twenty-four years ago. I was staying at a

cottage on an elevation which commanded an extensive sea-view. One morning my attention was called to a large, dark, undulating body, which moved rapidly through the sea. As it was some way out from shore, I naturally concluded it to be of enormous length. I lost no time in making inquiries as to the nature of this phenomenon, and was so fortunate as to discover a fisherman who had witnessed it. He told me it was a flight of petrels. But for this I should certainly have believed that I had seen the Great Unknown. I have often seen a similar phenomenon, but nothing nearly so striking as this.

Valentines, Ilford, September 16

C. M. INGLEBY

### RECENT PROGRESS OF SELENOGRAPHY

THE most active period in the study of selenography during late years is comprised between two epochs, that of the announcement of a change in the crater *Linné* in the year 1866 by Dr. Schmidt, Director of the Observatory at Athens, and that of the announcement of a new crater north-west of Hyginus, by Dr. Klein, of Cologne, in the year 1877. The years elapsed between the two events above-mentioned have been characterised more or less by the manifestation of considerable interest in lunar studies, of which the projection of a map of the moon 200 inches in diameter, to have been constructed under the auspices of the British Association for the Advancement of Science was the first indication. Of this map, four sections embracing an area of 100 square degrees of lunar latitude and longitude have been published, containing all the formations known in 1866-1868 to exist on this area, each of which is separately catalogued. Three of these sections, with catalogues, were published in the *Reports of the British Association* for 1866 and 1868; the fourth was published by the aid of a private subscription, in 1870. We are not aware that much use has been made of these areas and catalogues in endeavouring to ascertain if the 433 objects chronicled in them retain the characteristics they possessed in the above-mentioned years. It was a part of the duty of the Committee appointed by the Association to receive the reports of volunteer observers who undertook to examine the objects in certain subzones at stated intervals, which resulted in the addition of several new objects to those originally published, but nothing has been effected in this direction since the Committee was not reappointed in 1868.

In February, 1869, a map of the Grey Plain, the *Mare Serenitatis*, was published in the *Astronomical Register* for that month, by Messrs. Joynson and Williams. It contained several new objects not on former maps, and was followed in the course of a few months by a map and monogram of the same region. The map was divided into the British Association areas, and it contained 277 objects, each being distinguished by a British Association symbol; they were briefly described in a table of the areas in which any part of the Mare was found.

The four areas of the British Association map on a scale of 200 inches to the moon's diameter accompanied by a monogram of the formation *Hipparchus* on a scale of 100 inches, with that of the *Mare Serenitatis* form a collection of maps, which, with the descriptions of 710 separate objects embody the conditions of those portions of the moon's surface which were telescopically or photographically examined between 1866 and 1870. As placing in the hands of the student a body of facts especially suitable for future reference, these maps and monograms will furnish most important information on the condition of objects recorded on or in them during the four years above mentioned. It is in the future the real progress of the past is more truly measured.

In the years 1871 and 1872, Reports of a Committee appointed for discussing observations of lunar objects suspected of change, was read before the British Association for the Advancement of Science, the principal results being the discovery of about thirty-six spots and